

Wastewater Irrigation

Alabama Guide Sheet No. AL 634



Definition

Wastewater irrigation is the preferred method for transferring stored and/or treated liquid animal wastes to agricultural land for utilization as a fertilizer.

Wastewater irrigation is classified as either *effluent* wastewater irrigation which is for the liquid only portion of the wastewater, or as *slurry* wastewater irrigation which is created by agitation of the effluent wastewater and solids (sludge).

System Requirements

- Adequate buffers must exist between the spray fields and water sources. (Refer to NRCS Alabama Guide Sheet No. AL 590 – Application Distances for Applying Animal Manure and Organic By-Products)
- Wastewater irrigation systems are to be designed to prevent runoff, uniformly apply the wastewater, and to meet the nutrient needs of the plants.
- Nozzle sizes of sprinklers are to be appropriate for the consistency of the manure applied (minimum 1/4-inch for effluent wastewater irrigation).
- Agitation equipment shall be properly sized and of adequate numbers to properly mix effluent and solids into a slurry for irrigation.
- Traveling gun systems shall be equipped with engine powered travel drives and traveling gun speed control.
- Effluent systems shall include a strainer on the suction line. The suction intake shall be floated or

otherwise located at least 18 inches below the liquid surface and as far from the containment structure inlet pipe as possible.

- The solids content of the slurry will determine the type impeller selected for the pump system (Refer to ACES, Circular ANR-953).

Operation and Maintenance

Wastewater shall not be applied within 3 days of a predicted storm event with a probability of occurrence of 49 percent or more from the National Weather Service. In no case, shall the application rate of the wastewater irrigation equipment exceed either the intake rate or the available water holding capacity of the soil. (DO NOT APPLY TO SATURATED SOILS.)

Do not apply wastewater by irrigation when wind direction and velocity would cause drift towards residences, public areas, or roads.

Wastewater shall be applied only to land with actively growing crops or to cultivated land with incorporation as close to the planting date as possible (refer to NRCS Conservation Practice Standard, Code 590 – Nutrient Management). All land receiving wastewater shall be adequately treated for erosion concerns.

Properly collecting and lab analyzing effluent samples on a regular basis is the preferred method of nutrient content determination when irrigating effluent wastewater. An alternative and acceptable method is to use nutrient values from the Nutrient Management standard. In either case, the nutrient content of the effluent should be matched with the nutrient needs of the crop.

Field nitrogen test kits are the preferred method to determine on-site waste analysis during the agitation and pumping of slurry. Table values in the Nutrient Management standard can be used when test kits are unavailable. Using these values, the application rate should be adjusted (by adjusting the speed of the travelling gun or the pressure on the sprinkler heads) so that neither the soil intake rate nor the nutrient requirement of the crops are exceeded.

Wastewater should not be allowed to rise above the maximum design level of the lagoon or waste storage pond in order to maintain the emergency capacity for the 25-year, 24-hour storm.

Wastewater irrigation shall be scheduled during the dry times of the year to lower the liquid level in a lagoon to the minimum treatment level or to empty a storage pond. This provides the capacity needed to store the winter and spring rains and the wastewater that accumulates during the time of the year when irrigation cannot be scheduled.

When design sludge storage is full, the sludge should be removed from lagoons and storage ponds with thorough agitation and pumping of the slurry. Sludge removal intervals may vary depending upon the type of livestock operation, age of the lagoon, and management conditions. Sludge accumulation should be monitored annually.

Agitation of lagoons or storage ponds may need to start up to 24 hours prior to pumping to ensure thorough mixing of the effluent and solids. Multiple agitators will be needed for large lagoons. Angle the agitator at 45° to the bank for best circulation motion of the contents and to speed agitation. Continuously

agitate the lagoon or storage pond contents throughout the pumping-out procedure.

After the irrigation system is used to apply wastewater, it should be flushed with clean water.

Slurry is abrasive and can cause wear to the pump. Impellers and other parts should be routinely checked for excessive wear and replaced according to the manufacturer's recommendations. Bearings with grease fittings should be lubricated on a regular basis.

Sprinkler nozzles can become worn due to the abrasive nature of slurry. Therefore, the nozzle diameter should be routinely checked for tolerance and replaced as needed in order to maintain design application uniformity.

Sprinklers equipped with grease fittings should be lubricated on a regular basis. Impulse arms not properly operating should be repaired or replaced. Improper rotation of the sprinkler will result in the intake rate of the soil being exceeded resulting in runoff and/or erosion.

References

AL NRCS Conservation Practice Standards
Code 634 - Manure Transfer
Code 633 - Waste Utilization
Code 590 - Nutrient Management

AL NRCS Guide Sheets
AL 590 - Application Distances for Applying Animal Manure and Organic By-Products

ACES Circular ANR-953

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